REMARKS

Applicant hereby responds to the Office Action dated September. 15, 2004 in the above-referenced patent application. Before this Reply, Claims 1-22 were pending in the above-referenced patent application. Through this Reply, Claims 23-25 are added to the patent application such that now Claims 1-25 are pending in the above referenced patent application.

Claims 1, 2, 10-14 and 22 were rejected under 35 U.S.C. 102(e) as being anticipated by US 20020027610 to Jiang et al. ("Jiang"). Claims 3 and 15 were rejected under 35 U.S.C. 103(a) as being unpatentable over Jiang in view of USPN 6,122,017 to Taubman. Claims 7 and 19 were rejected under 35 U.S.C. 103(a) as being unpatentable over Jiang in view of Taubman and USPN 6,275,259 to Gowda et al ("Gowda"). New Claims 23-25 have been added. No new matter has been added.

Claims 4-6, 8-9, 16-18 and 20-21 were deemed allowable if written in independent form including limitations of base claims and any intervening claims. Applicant wishes to thank the Examiner for detailing the allowable claims.

Rejection of Claims 1, 2, 10-14 and 22 under 35 U.S.C. 102(e)

Rejection of Claims 1, 2, 10-14 and 22 under 35 U.S.C. 102(e) as being anticipated by Jiang is respectfully traversed because, for at least the following reasons, Jiang does not disclose all of the claimed limitations.

As per **Claim 1**, it is respectfully submitted that despite the Patent Office's interpretation, Jiang, does not disclose a method of computing a motion decision value, by:

Step a - inputting a video signal with an interlaced video sequence of fields,

Step b - computing a frame difference signal from a difference between a previous field and a next field in the video sequence,

Step c - forming a point-wise motion detection signal from the frame difference signal,

Step d - computing a region-wise motion detection signal from the point-wise motion detection signal and an adjacent point-wise motion detection signal delayed by one field, and

Step e - forming from the region-wise motion detection signal a motion decision value, as required by Claim 1.

On page 3 of the Office Action, the Examiner interprets Jiang, Fig. 3 and Para 23, to disclose Step b above. Then, the Examiner interprets Jiang's motion detector 109 to disclose Step c above. In Fig. 3 and Para 23, Jiang states that motion detection is accomplished by taking the luminance value differences of pixels of prescribed fields via pixel difference unit 107, as shown in FIG. 3, wherein to determine the motion for a missing pixel, five pixel luminance value differences are obtained by pixel difference unit 107 as Δc, Δn, Δs, Δa and Δb. Then, in Para 26 Jiang states that the pixel luminance value differences Δc, Δn, Δs, Δa and Δb are low pass

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filtered by the filter 108 to smooth them and the filtered version are supplied to the motion detector 109.

It is respectfully submitted that despite the description in Jiang, the Examiner is improperly interpreting Jiang's pixel luminance value differences Δc, Δn and Δs <u>both</u> as the claimed "frame difference signals" in Step b above, and as the claimed "point-wise motion detection signals" in Step c above (see Office Action, Page 3, paragraphs 2a.b and 2a.c). Jiang only discloses the pixel luminance value differences Δc, Δn, Δs, Δa and Δb, determined by the difference unit 107. There are no point-wise motion detection signals in Jiang as claimed.

Further, Jiang does not disclose: "forming a point-wise motion detection signal from the frame difference signal," as required by Claim 1. The Examiner states that motion detector 109 of Jiang discloses such a limitation. However, as discussed, Δc, Δn, Δs are simply pixel luminance value differences computed by the unit 107, not the motion detector 109. In addition, the values Δc, Δn, Δs relied on by the Examiner (Office Action, Page 3, paragraph 2a.c) are pixel luminance value differences and not point-wise motion detection signals that are formed from frame difference signals, as claimed. Unlike Jiang, according to the claimed invention, first a frame difference signal is computed from a difference between a previous field and a next field in the video sequence (Step b above), and then a point-wise motion detection signal is formed from the frame difference signal (Step c above). Units 107 and/or 109 of Jiang do not disclose such limitations.

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Nor does Jiang disclose Step d above: "computing a region-wise motion detection signal from the point-wise motion detection signal and an adjacent point-wise motion detection signal delayed by one field," as required by Claim 1. The Examiner interprets Jiang's Δa as a region-wise motion detection signal, and suggests that Jiang in Para 24 discloses the motion detector 109 generates Δa. However, discussed, in Jiang, Δa is generated by the difference unit 107, not unit 109. Further, Further, Δa is a pixel luminance value difference, not a region-wise motion detection signal, as claimed. In addition, not only there are no point-wise motion detection signals in Jiang, but also Jiang does not disclose that the motion detector 109 computes a region-wise motion detection signal from the point-wise motion detection signal and an adjacent point-wise motion detection signal, as claimed.

The Examiner further suggests that the motion detector 109 computes motion metric Δa, about a region utilizing the point detected motion (max/min of the region utilizing the computed motion about a point). However, not only Δa is not a region-wise motion detection signal as claimed, Jiang does not disclose computing Δa from: "point-wise motion detection signal and an adjacent point-wise motion detection signal delayed by one field", as claimed. Indeed, Δa is computed from luminance values, not from a point-wise motion detection signal and an adjacent point-wise motion detection signal delayed by one field.

Further, in Para 27, Jiang describes the motion detector 109 detecting motion of a missing

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pixel as follows:

> "*Motion detector 109 actually filters the pixel luminance value differences from*
>
> *pixel difference unit 107 to remove aliases occurring under motion conditions.*
>
> Moreover, it should be noted that all the pixel luminance value differences noted
>
> above might not be used in determining the motion of the missing pixel. The
>
> motion metric Δ at a missing pixel may be defined by employing some
>
> combination of the obtained pixel luminance value differences, for example, by
>
> $\Delta=\max(\Delta_c, \Delta_a)$. Other combinations of the pixel luminance value differences may
>
> also be used to obtain the motion metric at the missing pixel, for example,
>
> $\Delta=\max(\Delta_c, \min(\Delta_n, \Delta_s))$, is employed in motion detector 109 in this
>
> implementation. Note that the use of $\min(\Delta_n, \Delta_s)$ reduces the spreading of
>
> spurious motion in a vertical direction of the image. It is also important to note
>
> that our implementation is significantly simplified because the motion values are
>
> computed directly from the pixel luminance value differences *employing the*
>
> *minimum and maximum value choices.*" (emphasis added).

As is clear from the above passage, the motion detector 109 does not form a point-wise

motion detection signal from a frame difference signal, as claimed herein. There is no such

disclosure anywhere in Jiang. The motion detector 109 computes motion values using the

min/max value choices of pixel luminance value differences. Nor does the motion detector 109

compute a region-wise motion detection signal from the point-wise motion detection signal and

an adjacent point-wise motion detection signal delayed by one field, as claimed herein. For at least these reasons, rejection of Claim 1 and all claims dependent therefrom should be withdrawn. Similarly, rejection of **Claim 13** should be withdrawn for at least the above reasons.

Claim 2 adds further limitations to Claim 1, not disclosed by Jiang, and is therefore allowable for the same reasons as provided in relation to Claim 1. Similarly, rejection of **Claim 14** should be withdrawn for at least the above reasons.

Claim 10 includes limitations of Claim 1, and further limitations, not disclosed by Jiang and is therefore allowable for at least the reasons provided in relation to Claim 1. Similarly, rejection of **Claim 22** should be withdrawn for at least the reasons provided in relation to Claim 10.

As per **Claim 11**, despite the Patent Office's interpretation, Jiang, paragraph 42, does not disclose: "varying the motion decision value between 0 and 1 as a function of an estimate of the degree of motion at the given location and, upon estimating a high degree of motion, heavily weighting the output signal towards the spatially interpolated signal and, upon estimating a low degree of motion, heavily weighting the output signal towards the temporally interpolated signal," as required by Claim 11. The blending factor in Jiang is not the same as the motion decision value as claimed. The Patent Office has not met its burden in showing that Jiang's blending factor is the same as the motion decision value as claimed. If Claim 11 is one again

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rejected, Application respectfully requests the Examine to specifically support the interpretation that Jiang's blending factor is the same as the motion decision value as claimed.

Further, in paragraph 42, Jiang shows the motion metric values varying between 0 and 8, not between 0 and 1, as claimed. In addition, as claimed, upon estimating a high degree of motion (e.g., motion decision close to 1), the output signal is heavily weighted towards the spatially interpolated signal, and upon estimating a low degree of motion (e.g., motion decision close to 0), the output signal is heavily weighted towards the temporally interpolated signal. By contrast, the blending factor in Jiang has the values of 0 for motion metric values 0, 1, 2 and 3.

Fig. 5 in Jiang (relied on by the Examiner) is explain in Paras 40 and 41 as a graphical representation of a look up table including blending factors that may be used in the interpolation. The look up table is represented as a stretched sinusoidal curve, where the blending factor has 8-bit values. Jiang states that the curve shown in FIG. 5 has significant effects on the quality of the de-interlaced images. Shifting the curve to the left causes more pixels to be interpolated based on field, and therefore reducing aliasing. On the other hand, shifting the curve to the right may increase aliasing. The look up table of FIG. 5 yields the blending factor based on the supplied median motion metric output from spatial median filter 110. Then, the blending factors are supplied to the blender 112.

It is respectfully submitted that there is no disclosure of the claimed limitations in Fig. 5 or corresponding description in Jiang as the Examiner interprets. If Claim 11 is one again rejected, Application respectfully requests the Examine to specifically support the interpretation that Jiang's Fig. 5 discloses any of the claimed limitations. For at least these reasons, rejection of Claim 11 should be withdrawn.

Further, in paragraph 43, Jiang states that any motion metric value of less than 4 yields a blending factor of 0 and any motion metric value of 8 or more yields a blending factor 1. For at least these reasons, rejection of **Claim 12** should be withdrawn.

Rejection of Claims 3, 7, 15 and 19 under 35 U.S.C. 103(a)

Rejection of Claims 3 and 15 under 35 U.S.C. 103(a) as being unpatenable over Jiang in view of Taubman is respectfully traversed because the references, alone or in combination, do not disclose all of the claimed limitations.

As per **Claim 3**, Jiang does not disclose all of the claimed limitations. For example, as the Patent Office also states, Jiang does not disclose the low-pass filter matrix as claimed herein. Further, no such low-pass filtering matrix is suggested by Jiang. Further, unlike the claimed invention, Taubman is directed to providing motion-compensated multi-field enhancement of still images. In addition, Taubman does not disclose a two-dimensional matrix as claimed.

There is no suggestion in Jiang to modify it according to Taubman as the Patent Office does. It is well settled that in order for a modification or combination of the prior art to be valid, the prior art itself must suggest the modification or combination, "...invention cannot be found obvious unless there was some **explicit** teaching or suggestion in the art to motivate one of ordinary skill to combine elements so as to create the same invention." *Winner International Royalty Corp. v. Wang*, No. 96-2107, 48 USPQ.2d 1139, 1140 (D.C.D.C. 1998) (emphasis added). "The prior art **must provide** one of ordinary skill in the art the **motivation** to make the proposed molecular modifications needed to arrive at the claimed compound." *In re Jones*, 958 F.2d 347, 21 USPQ.2d 1941, 1944 (Fed. Cir. 1992) (emphasis added).

Jiang does not suggest the motivation to modify it as proposed. Jiang and Taubman are individually complete and functionally independent for their limited specific purposes and there would be no reason to make the modification proposed by the Patent Office. Therefore, because the references do not suggest the modification proposed by the Patent Office the modifications is improper. Further, it is respectfully submitted that the Patent Office is improperly using "hindsight" and the teachings of Applicant's own claimed invention in order to modify Jiang to render Applicants' claims obvious. No prima facie case of obviousness has been established. For at least these reasons, rejection of Claim 3 should be withdrawn. For similar reasons, rejection of **Claim 15** should be withdrawn.

Rejection of Claims 7 and 19 under 35 U.S.C. 103(a) as being unpatentable over Jiang in

view of Taubman and Gowda is respectfully traversed because the references, alone or in combination, do not disclose all of the claimed limitations.

As per **Claim 7**, as the Patent Office also states, Jiang and/or Taubman do not disclose low-pass filtering the region-wise motion detection signal prior to the outputting step, as required by Claim 7. As noted in relation to Claim 1, Jiang does not disclose forming a point-wise motion detection signal and then computing a region-wise motion detection signal from the point-wise motion detection signal and an adjacent point-wise motion detection signal delayed by one field.

Further, Jiang cannot, and does not disclose, low-pass filtering the region-wise motion detection signal before output. There is no such component/feature in Jiang. The Patent Office has summarily decided that the claimed limitation is obvious, and a matter of design choice, without meeting its burden. No prima facie case of obviousness has been established. Further, unlike the claimed invention, Gowda is directed to a digital automatic gain control circuit for image system. In col. 3, lines 10-21 (relied on by the Examiner), Gowda mentions an optional low pass filter 112 for the DAC 110 in Fig. 1. This has nothing to do with the claimed limitation of low-pass filtering the region-wise motion detection signal prior to the outputting, as claimed.

Jiang does not suggest the motivation to modify it as proposed. Jiang and Gowda are individually complete and functionally independent for their limited specific purposes and there would be no reason to make the modification proposed by the Patent Office. Therefore, because

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Jiang does not suggest the modification proposed by the Patent Office the modifications is

improper. The LPF 108 in Jiang has nothing to do with low-pass filtering the region-wise

motion detection signal prior to the outputting step, as claimed. Further, it is respectfully

submitted that the Patent Office is improperly using "hindsight" and the teachings of Applicant's

own claimed invention in order to modify Jiang to render Applicants' claims obvious. For at

least these reasons, rejection of Claim 7 should be withdrawn. For similar reasons, rejection of

Claim 19 should be withdrawn.

New Claims

New Claims 23-25 are allowable over the cited references, alone or in combination, for at
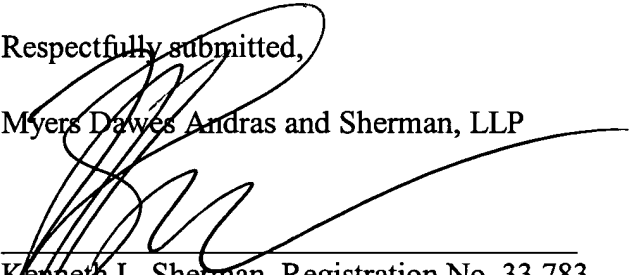
least the reasons provided above.

Conclusion

For these and other reasons, it is respectfully submitted that the rejection of the rejected claims should be withdrawn, and all of the claims be allowed. Accordingly, reexamination, reconsideration and allowance of all the claims are respectfully requested.

If necessary, the Commissioner is hereby authorized to charge payment or credit any overpayment to Deposit Account No. 01-1960 for any additional fees required in connection with this filing.

Respectfully submitted,

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